

STELLAR AIRPARK  
MASTER PLAN REPORT  
CHANDLER, ARIZONA

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## INVENTORY

The following table presents an inventory of existing improvements and facilities at Stellar Airpark, Chandler, Arizona and salient general airport information.

General: Airport Location .... Latitude 33° 17' 53" N.  
Longitude 111° 54' 54" W.  
Airport Elevation ... 1177' Above Sea Level  
Airport Land Area ... 53 Acres  
Avg. Mean Max. Temp.. 105° F. (July)  
Approach ..... Visual, 20:1  
Airport FAA Class ... Basic Utility II  
Ownership ..... Private  
Fixed Base Operator.. Keeling Aviation Inc.  
Based Aircraft ..... 116  
Utilities Furnished.. Electric, Salt River Project  
Gas, Arizona Public Service  
Water, City of Chandler  
Telephone, Mountain Bell  
Ground Access .... Williams Field Road  
(paved, two-lane arterial)

Airfield: Runway Bearing..... N. 0° 03' 08" E.  
Runway Length..... 4000'  
Runway Width..... 50' South  $\frac{1}{2}$ , 60'± North  $\frac{1}{2}$   
Displaced Threshold.. Yes, Runway 35, 300'  
E. Taxiway Length.....2300' North Half  
W. Taxiway Length.....2300' North Half  
E. Taxiway Width.....40'  
W. Taxiway Width.....50'

### Nav aids, Visual Aids:

Runway Lighting.....LIRL (N. 2000')\*  
Taxiway Lighting.....None  
Runway Threshold  
Lighting.....Yes  
Beacon.....Yes  
Windsock.....Yes

#### Landside Facilities:

Apron Area.....	7000 S.Y.
Hangars.....	2 Maintenance
Shades.....	31
Tiedowns.....	58
Fuel Storage.....	8000 GAL. 80 Octane
	.....10000 GAL. 100 Octane
Fuel Dispersing.....	Truck and Fuel Island
Wash Rack.....	Yes
Security Lighting.....	Yes
Auto Parking.....	24

\*Note: Items marked with asterisks are considered substandard, or deficient. Discussions of these facilities is included in the Facilities Requirements and Capital Improvements portion of this report.

#### FORECASTS

The forecasting of operational activity at Stellar Airpark is primarily concerned with the needs of airport as it relates to those individuals and businesses for whom the facility was constructed. Most of the operational demand generated at Stellar will likely be by those individuals who will use this facility in lieu of other airports because of its unique nature. The basis of the forecasting shall, therefore, be restricted to the projected aviation activity generated directly and indirectly by Stellar Airpark and its occupants.

The unusual nature of Stellar Airpark as a private, non-profit, residential, commercial and industrial facility requires special consideration in developing forecasts. First the airport is unique in the southwest from the magnitude of private, commercial and industrial activity proposed. Approximately 150 lots having direct taxiway access. Little historical data is available from similar facilities. Second, the lack of continuous monitoring at most private facilities make it difficult to establish the actual activity at the field.

## Based Aircraft and Operational Forecasts

Two regional airport activity forecasts have included Stellar Airpark within their studies; the Maricopa Association of Government (MAG) Aviation System Plan, 1978, and the Arizona Department of Transportation (ADOT) State Aviation System Plan (SASP), 1978. Both plans used regional and local airport trends as well as individual airport characteristics to generate the based aircraft and operations forecast. The results of both studies is summarized below:

TABLE I

### Based Aircraft

	1977	1980	1985	1990	1995	2000
MAG	74		90	105		226
SASP	74	101	147	196	245	301

### Aircraft Operations

	1977	1980	1985	1990	1995	2000
MAG	59100	---	63600	74200	----	157000
SASP	27000	46000	78000	111000	145000	184000

The actual number of based aircraft at Stellar Airpark in 1981 is 116. The figure is slightly ahead of the 110 value interpolated from the SASP and significantly ahead of the 82 interpolated from the MAG forecasts.

The accuracy of the SASP figures for based aircraft is dependent on a steady increase in activity at Stellar. The development of the abutting industrial parks, additional aviation residential subdivision, and construction of the proposed apron expansion is expected to boost activity at the airfield significantly above its present growth rate. Because of the anticipated discrepancies with the MAG and SASP Forecasts an independent forecast analysis was done.

The existing 116 spaces at Stellar are currently inadequate to meet projected demands and an approximate doubling of available spaces will not meet future demands for aircraft parking. Therefore demand will have to be diverted to alternate parking areas. The most probable locations include the basing of business aircraft on parcels in the industrial park and the continued basing of private aircraft on residential properties. These alternatives do not conflict with any existing use patterns at the facility. In addition, a ceiling should be established for the FBO for based aircraft at the facility. By apportioning the parking needs in the above manner, adequate room for transient aircraft may be maintained.

The forecasts of operational activity at Stellar Airpark was formulated from projections of based aircraft and the operations which were anticipated from each based aircraft. Assuming 1:25 aircraft is based at each lot having taxiway access a total of 189 aircraft could be located off the airport proper. Aircraft from taxiway access lots included an estimated 10 percent which would have at least two or more aircraft including helicopters.

TABLE II  
Stellar Airpark Aircraft Distribution

	On Airport	Off Airport	Total
Existing	89	27	116
Future	149	189	338

The actual number of business aircraft involved and the level of aircraft activity will be sensitive to the tenant operation. The FBO activity is forecasted to increase as activity increases at the facility, and as the field transforms to a business, general aviation hub. The home-owner requirements for basing aircraft is also expected to grow with the expansion of the residential subdivision as well as to accommodate aircraft currently parked on

private property. The above table represents all aircraft expected to be based on or adjacent to Stellar Airpark. From preliminary layouts, the approximate optimum number of on airport aircraft spaces available at Stellar are:

TABLE III  
Available Parking Spaces on Stellar Airpark

	Hangars	T-Shades	Tiedowns	Transient	Total
Existing	0	31	54	4	89
Future	35	31	76	7	149

#### Aviation Demand Forecast

The operational activity at Stellar Airpark was computed by assignment of average annual operations per each based aircraft. The based aircraft figures used were from the "unconstrained" based aircraft table since these aircraft represent the true number of planes based near or on the airport. The estimated average number of annual operations per general aviation aircraft was based on FAA AC 150/5300-4B. The publications provide the high and low averages which are characteristic for an urban area airport. Due to the high proportion of business activity anticipated, the high average of 600 operations annually per aircraft was used for the future forecast. The existing activity at Stellar was estimated at 400 operations per aircraft.

TABLE IV  
Stellar Airpark Aviation Activity

	Based (On/Off) Aircraft	Annual Operations
Existing	116	46400
Future	338	202800

Comparison of the existing runway system and existing number of operations indicates the airfield system functioning above its calculated capacity of 157,000 annual operation. Analysis of airfield runway/taxiway capacity was based

on FAA AC 150/5060-1A and AC 150/5060-3A. Peak-day and peak-hour traffic was calculated directly from figures established for annual operations. Factors used in this study were obtained from a review of data contained in a FAA publication entitled Air Traffic Activity, Calendar Year 1974. The following peak day and peak traffic figures were established.

TABLE V  
Stellar Airpark Peak Aircraft Activity

	Annual Operations	Peak-Day	Peak-Hour
Existing	46400	232	28
Future	202800	1014	126

#### Auto Parking Demand

Requirements for future auto parking was forecasted by multiplying peak hour pilot/passenger forecasts by a factor of 1.3. parking spaces will be required for peak activity at Stellar. Part of this demand may be accomodated by the continued use of hangars by the tenants for parking and the parking within adjacent residential and industrial lots by their occupants.

#### FACILITIES REQUIREMENTS

The facilities requirements portion of this report is separated into two distinct categories; airside facilities and landside facilities. The airside facilities include the runway, taxiway lighting, visual aids, fuel facilities, marking, clear zones, aircraft parking, and other areas which deal directly with aircraft movement. Landside facilities are support facilities for the aviation operations and include FBO areas, auto parking, access, drainage, fencing, security lighting and utilities.



## AIRSIDE FACILITIES

### Runway 17/35

The existing runway is 4000 feet long, 50 to 60 ( $\pm 5$ ) feet in width, the north half paved with asphaltic concrete and the south half a seal coat on aggregate base. This runway length is consistent with Basic Utility Stage II criteria set forth by the FAA in AC 150/5300-6. A 300 feet displaced threshold is recommended on the existing Runway 35. The north half of the existing runway pavement is in fair condition and with proper maintenance, weed control, and 2" asphaltic concrete overlay it should provide a serviceable pavement for the next ten years. The south half of the runway should be reconstructed using 2" of asphaltic concrete on 4" of aggregate base. Provided the subgrade and aggregate are compacted to modified proctor standards. The south half of the runway should also be widened to provide a 60 foot paved surface.

Dependent on the needs of future general aviation aircraft using the airport, the runway could be extended an additional 200 feet to accommodate all aircraft weighing up to 12,500 pounds. The FAA defines a General Utility airport as being capable of accommodating operations for all aircraft 12,500 pounds gross weight or less. The General Utility airport can accommodate the majority of all twin engine propeller driven corporate aircraft. Additional runway exits are suggested, see Airport Layout Plan, to expedite the movement of traffic on and off the runway.

### West Parallel Taxiway

The west taxiway currently provides access to the private residential taxiways, FBO area, and aircraft

hangars and tiedowns. The current 50 foot pavement width and 150 foot runway/taxiway centerline separation are adequate for Utility airports. Proper maintenance including weed control, and a 2" asphaltic concrete overlay will upgrade the structural capacity of the pavement consistent with utility airport standards. The taxiway should be extended south of the parking apron as additional residential and commercial lots are developed. A new exit at the south threshold should also be constructed to keep all taxiing movements off an active runway.

#### East Parallel Taxiway

The east taxiway parallels the north half of the runway and provides access to the newly developed Stellar Industrial Airpark No. 1. The taxiway conforms to the Utility standards of 40 feet width and 150 feet centerline separation from the runway. The taxiway pavement was constructed during the spring of 1981 and is in excellent condition with no major maintenance requirements with a structural section of 2" of asphaltic concrete on 7" of aggregate base. The taxiway will be extended the full length of the runway and a new runway exit constructed at the south threshold with the development of Stellar Industrial Airpark No. 2. The taxiway will require periodic surface treatments at approximately six year intervals to insure the structural capability of the paving is preserved.

#### Airfield Lighting

The existing Low Intensity Runway Lighting (LIRL) at Stellar extends only the north half of the runway. The south half of the runway and the south threshold are presently unlighted. The existing LIRL is in

fair condition with some maintenance required for broken fixtures and bulbs. The north threshold has light fixtures which are in fair condition. The extension of the LIRL to the south and the placement of displaced threshold lighting on the south end will greatly enhance the safety of night operations at Stellar. (With the forecasted increase in aviation activity, a proportional increase in night operations may be expected.) The existing taxiways are not lighted and future taxiway lighting is not recommended due to its cost. In lieu of lights, the taxiways may be marked with inexpensive retroreflective markers.

#### Visual Aids

Visual aid is limited to a beacon, located on the FBO building. Its present location is below the minimum FAA separation distance of 350 feet from the runway centerline. The 500 feet desired FAA separation would place the beacon outside the existing airport boundaries. Therefore, the existing beacon should remain in service at its present location until a new site may be selected for a new beacon. The Federal Aviation Administration (FAA) is proposing to install a Two-Box Visual Approach Slope Indicator (VASI) System on Runway 17. This visual approach aid, when in service, will provide guidance to pilots landing at Stellar Airpark via light beams which indicate the proper approach slope. These boxes installed in pairs, will be located on the East side of the runway as shown on the Airport Layout Plan.

## Fuel Facilities

The existing facility apron has one pump each for 80 and 100 octane and one truck for apron fueling. Storage is located in underground tanks at the apron with tank capacities of 8000 gallons for 80 octane and 10000 gallons for 100 octane. The forecasted fuel consumption of 48000 gallons per week will require an additional storage of 30000 gallons based on a one week fuel supply. The storage required includes a 1.1 multiplier to consider peaking factors and reserve. Due to the expense of fueling systems, it is recommended that the existing fueling apron and storage be retained with storage supplemented by two additional 1500 gallon storage tanks. The majority of the new fuel requirements is expected to be 100 octane due to increase in high performance business traffic.

## Airfield Marking

The runway is presently being remarked to distinguish the displaced threshold on 35 and the threshold on 17. No other runway markings will be required until the pavement is rehabilitated. Because of the numerous access taxiways which lead from the parallel taxiways, it is recommended that each entrance be designated and marked to expedite aircraft circulation.

## Clear Zones

Clear zones on both runway thresholds extend beyond the airport boundary. The landholders to the north of the airport are planning their development around the existing runway clear zone and no changes are expected in the north approach to Stellar. Land immediately south of Stellar Airpark is part of the Gila River Indian Reservation. This area in the

Reservation is not expected to be developed in the near future, however, a line of contact should be established to prevent future land use conflicts. An attempt to secure aviation easements for the property outside the airport should be made.

The 69 kv, Salt River Project transmission line parallels Pecos Road and has required the displacement of the 35 threshold. Ideally the line should be buried, however, this alternative is prohibitively expensive. Obstruction lighting and line markers should be placed on the poles and lines.

#### Aircraft Parking

The available aircraft parking for the existing and future aprons is limited to that 10 acre parcel airport property adjacent the terminal. The Forecast chapter of this report discussed the discrepancy between growing demands and the limited spaces available to Stellar. The recommended plan is maximize the number of based aircraft spaces on the future apron as well as encourage the basing of aircraft on the industrial, commercial, and residential properties. The Terminal Area Plan provided with this report illustrates the proposed aircraft parking configuration.

#### Miscellaneous Airside Facilities

The existing wind cone is not easily visible and not lighted. The wind cone should be distinguished from the surrounding area and lighted to increase visibility. The airport property as currently configured does not contain sufficient land resources on which to locate a segmented circle, wind cone and wind tee. If a segmented circle and attendant improvements

are desired at the airport, a portion of an industrial or residential lot must be reserved for installation of these improvements.

## LANDSIDE FACILITIES

### FBO Area

The existing fixed base operator (FBO) at Stellar is Keeling Aviation Inc. The facilities used by the FBO include a mobile trailer office and a maintenance hangar. The current facilities are adequate for the limited based aircraft at Stellar, however, with any significant increase in aircraft, a larger facility will be required. An FBO area designated on the Terminal Plan includes a building with the following functional areas; maintenance hangar, offices, lobby, storage, and equipment/tool shop. In addition to the hangar/maintenance/office facility, proposed tiedown areas may be designated for future T-shade or T-hangar construction by an FBO.

### Auto Parking

Auto parking demands forecasted in Chapter 2 may be partially accommodated by parking lots adjoining 76th Street. Additional parking may be also designated adjacent the FBO area for the employees. During the peak periods the proposed spaces does not serve the full demand and the remaining autos will need to be parked in their respective aircraft tiedown positions.

## Access

Access to the airport is from Williams Field Road via 76th Street. No improvements in access to the site is required.

## Drainage

Present drainage patterns crowd the airport is sheet flow into the neighboring agricultural fields or into swales adjacent the runway and taxiway. Further development of the industrial park will include grading of retention and detention areas. The majority of the on-site flow shall drain to the south threshold and into retention basins outside the safety area.

## Fencing

Barbed wire fencing surrounds the mile square section occupied by the airport and associated subdivisions. Chain link fencing fronts 76th Street along the parking apron. The current fencing is considered adequate for the present aviation activity. As the region develops, it may be necessary to provide additional lengths of chain link fencing in the highway traveled area of Williams Field Road to prevent inadvertent entry into the airport.

## Security Lighting

The two existing pole mounted lamps are adequate for illuminating the apron, however, with development of the new apron an additional lighting is suggested.

## Utilities

Utility service is available to the proposed expansion area. However, the facilities layout should enable free access to two major utilities which pass through the airport. One is an El Paso Natural Gas line while the other is an irrigation lateral of the Salt River Water Users Association. Both Utilities retain a easement along the  $\frac{1}{4}$  section line and will run through the future parking apron.



### CAPITAL IMPROVEMENTS PROGRAM

The following table lists, in priority order a suggested capital improvements program for Stellar Airpark. In addition to those improvements tabulated below routine maintenance, i.e., mowing and spraying of grass and weeds, filling and sealing of pavement cracking should be accomplished annually. Also application of bituminous seal coats to pavements on a 5-6 year frequency should be scheduled as part of the routine airport maintenance program.

# CAPITAL IMPROVEMENTS PROGRAM

## STELLAR AIRPORT

<u>Priority</u>	<u>Description</u>	<u>Cost</u>
1.	Runway Marking Including; Displaced Threshold Runway 35, Runway 17 Threshold	\$ 1,500.00
2.	Install Visual Approach Slope Indicator (VASI) Runway 17	
3.	Construct Partial Parallel Taxiway Adjacent Stellar Industrial Airpark No. 2 East Partial Parallel Taxiway (40' X 2300) 2" A.C. 4" A.B.C. Runway Exit (1 Each)	\$ 80,000.00 \$ 5,000.00 <u>\$ 85,000.00</u>
	Total	
4.	Install Obstruction Lights on 69 KV Power Line, Runway 35 Approach	
5.	Reconstruct South Half of Runway 17-35 (60' X 1940')	\$100,000.00
6.	Rehabilitate North Half Runway 17-35 (2" A.C. overlay) (60' X 2060') Runway Exits (2 Each)	\$ 70,000.00 \$ 10,000.00 <u>\$ 80,000.00</u>
	Total	
7.	Rehabilitate North Half West partial Parallel Taxiway (2" A.C. overlay) (40' X 2060')	\$ 50,000.00
8.	Install Low Intensity Runway Lighting, Runway 17-35	\$ 90,000.00
9.	Construct South Half West Partial Parallel Taxiway (40' X 2300') 2" A.C. 2" A.C. 4" A.B.C. Runway Exit	\$ 80,000.00 \$ 5,000.00 <u>\$ 85,000.00</u>
	Total	
	Rehabilitate Aircraft Parking Apron Include 3600 S.Y. 2" A.C. overlay and 13,500 S.Y. Seal Coat	\$ 40,000.00
	Aircraft Parking Apron Improvements A.C. 14,725 S.Y. T-Hangars 35 spaces	\$100,000.00 \$465,000.00 <u>\$565,000.00</u>
	Total	

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

**JOB TITLE** Stellar Airpark

**JOB. NO. 1268**

[illegible][illegible]

SECTION \_\_\_\_\_

DESIGNED BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

JOB TITLE Stellar Airpark

JOB. NO. 1268

## PRELIMINARY COST ESTIMATE

ITEM NO	DESCRIPTION	ESTIMATE QUANTITY	UNIT	UNIT COST	TOTAL COST
7	Rehabilitate North Half West Parallel Taxiway				
	40' X 2060' = 9,155 S.Y.				
	Use 9,200 S.Y.				
	2" A.C.	9,200	S.Y.	\$ 3.25	\$ 29,900.00
	Tack Coat	8	TON	\$ 350.00	\$ 2,800.00
	Surface Prep.	1	L.S.	\$5,000.00	\$ 5,000.00
	Marking	1	L.S.	\$1,200.00	\$ 1,200.00
	Construction Sub-Total				\$ 38,900.00
			Engr.		\$ 7,000.00
			Contin.		\$ 4,100.00
			TOTAL		\$ 50,000.00
& 9	Construct South Half East Parallel Taxiway				
	40' X 2300' = 10,222 S.Y.				
	Use 10,300 S.Y.				
	2" A.C.	10,300	S.Y.	\$ 3.25	\$ 33,475.00
	4" A.B.C.	10,300	S.Y.	\$ 1.50	\$ 15,450.00
	Grading	10,300	S.Y.	\$ 1.65	\$ 16,995.00
	Marking	1	L.S.	\$1,200.00	\$ 1,200.00
	Construction Sub-Total				\$ 67,120.00
			Engr.		\$ 7,500.00
			Contin.		\$ 5,380.00
			TOTAL		\$ 80,000.00

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

**JOB TITLE** Stellar Airpark

**JOB. NO. 1268**

PRELIMINARY	COST	ESTIMATE
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[illegible]

**JOB. NO. 1268**

PRELIMINARY	COST	ESTIMATE
1.00	1.00	1.00
2.00	2.00	2.00
3.00	3.00	3.00
4.00	4.00	4.00
5.00	5.00	5.00
6.00	6.00	6.00
7.00	7.00	7.00
8.00	8.00	8.00
9.00	9.00	9.00
10.00	10.00	10.00
11.00	11.00	11.00
12.00	12.00	12.00
13.00	13.00	13.00
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15.00	15.00	15.00
16.00	16.00	16.00
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37.00	37.00	37.00
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40.00	40.00	40.00
41.00	41.00	41.00
42.00	42.00	42.00
43.00	43.00	43.00
44.00	44.00	44.00
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91.00	91.00	91.00
92.00	92.00	92.00
93.00	93.00	93.00
94.00	94.00	94.00
95.00	95.00	95.00
96.00	96.00	96.00
97.00	97.00	97.00
98.00	98.00	98.00
99.00	99.00	99.00
100.00	100.00	100.00

-20-

## PAVEMENT EVALUATION

On December 27, 1979 Engineers Teating Laboratories, Inc. prepared an evaluation of the airfield pavement at Stellar Airport. This report suggested a 2½" Asphaltic Concrete on 7" Aggregate Base Course pavement section for the airport based on a 15,000 # design aircraft. The report suggested that all existing pavement be removed and replaced with the recommended pavement section. Recent discussions with Engineers Testing Laboratories, indicate that the airfield pavement sections suggested in their December 1979 report can be reduced if the subgrade is compacted to modified proctor standards. Further a reduction in design aircraft weight from 15,000 # to 12,500 #, the standard for Utility Airports, will also reduce the required airfield pavement section.

According to Engineers Testing Laboratories personnel, a California Bearing Ratio (CBR) of 15 can be expected from the subgrade soils at Stellar Airpark, if they are compacted to 95% of maximum density, using modified proctor standards. According to Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5320-6C, Figure 5-2 a 6" Asphaltic Concrete pavement section would be required for a 12,500 design aircraft on subgrade soil having a CBR of 15. It is suggested that next paving of Stellar Airport be, 2" of Asphaltic concrete paving on 4" of Aggregate base course placed on a subgrade compacted to 95% of maximum density as determined by modified proctor standards.

Assuming that 1" of existing Asphaltic Concrete surface course would equal 1½" of Aggregate Base, and 1" of existing base course material equals 1" of aggregate base course for the design section, a 2" asphaltic concrete overlay of the existing airfield pavement, except the South ½ of the runway, should result in a pavement that is reasonably comparable to the suggested (2" A.C. 4" A.B.C.) design section. The South half of the runway should however be reconstructed since this pavement will require a 10 foot widening to upgrade it to minimum FAA standards. If the existing pavement on the South half of the runway remains it could be brought up to the suggested structural standards by applying a 3" Asphaltic Concrete overlay.